

REMARKS/ARGUMENTS

In view of the foregoing amendments and the following remarks, the applicants respectfully submit that the pending claims are not rendered obvious under 35 U.S.C. § 103. Accordingly, it is believed that this application is in condition for allowance. **If, however, the Examiner believes that there are any unresolved issues, or believes that some or all of the claims are not in condition for allowance, the applicants respectfully request that the Examiner contact the undersigned to schedule a telephone Examiner Interview before any further actions on the merits.**

The applicants will now address each of the issues raised in the outstanding Office Action.

Objections

Original claims 4 and 7 were objected to by the Examiner as being dependent upon a rejected base claim. However, the Examiner found that these claims include allowable subject matter and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, the applicants have rewritten claims 4 and 7 in independent form as suggested. Therefore, claim 4 (as amended) and claim 7 (as amended) are allowable.

Rejections under 35 U.S.C. § 103

Claims 1-3, 5, and 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,860,912 ("the Chiba patent") in view of U.S. Patent No. 6,310,650 ("the Johnson patent"). The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

Before discussing various patentable features of the claimed invention, the applicants first introduce the present invention and the cited patents.

The present invention

Claim 1 of the present invention is directed to correcting distortion errors due to the projected output light signals from the plurality of projectors having parallax resulting in imprecise overlaying alignment (e.g., from the placement of the projectors) and distortions on the display. Such errors are unavoidable because the placement of the output of each projector is at a different point in space since the two projectors cannot occupy the same space. Correction processing means of claim 1 is directed to providing correction for this source of distortion.

It should be noted that the undesirable parallax of the output beams from the image projectors to the display should not be confused with the parallax associated with a different line of sight from each of the viewer's eye to the same point on the display screen, as such parallax is a useful and integral part of stereoscopic viewing.

The Chiba patent

The Chiba patent is directed to a stereoscopic-vision endoscope system which collects optical images along different lines of sight having parallax. See the Chiba patent col. 5 lines 7-9 which recites in part:

an objective optical system provided on the forward end of the insertion part, for focusing two images having parallax with respect to the object

The parallax regarding the incoming received optical signals causes distortion to which Chiba patent image correction is applied. See the Chiba patent col. 5 lines 28-31 which recites in part:

Thus even when there is distortion or the like, the respective objective optical systems which are disposed at the forward end can be corrected so that the image more faithfully represents the object,

The parallax of the incoming light signals, to which the Chiba patent applies correction, should not be confused with the parallax associated with a different line of sight from each of the viewer's eye to the same point on the display, as such parallax is a useful and integral part of stereoscopic viewing. Further, the correction applied is to correct parallax due to parallax before display (interpreted by the Examiner as "projection") of the signals.

With regard to claim 1, the Examiner asserts that the Chiba patent discloses all of the features of claim 1

of the present application with the exception of the use of a plurality of image projection means. The Examiner relies upon the Johnson patent to disclose the use of a plurality of projectors and asserts that it would have been obvious to replace the monitor of Chiba with the projectors of Johnson as both are CRT based and projectors are an inexpensive alternative for large displays. The applicants respectfully disagree with the Examiner's conclusions.

The Examiner equates monitor 5 (Figure 7) of the Chiba patent with image projecting means of claim 1 of the present application, but fails to specifically identify the claimed image display means in the Chiba patent. Later, with regard to the correction processing means the Examiner cites col. 17 lines 17-18 which recites in part, "... which are displayed on the monitor". Thus, the Examiner is characterizing the monitor 5 of Figure 7 of the Chiba patent as the image display means of claim 1 of the present invention. This is an inconsistent position since the Examiner is interpreting the monitor 5 of the Chiba patent as both image projecting means and image display means.

The Examiner asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the monitor of Chiba with the projectors of the Johnson patent as both are CRT-based and projectors are an inexpensive alternative for large displays.

The Applicants respectfully disagree. If an additional display means were provided, the endoscopic system of Chiba patent would still be non-functional, as the output from the processing device 4 and input to the

monitor in the Chiba patent system is structured for a single signal interface (e.g., one set of R,G,B outputs at a time, with the switching and control circuitry being internal to the processing device 4). (See, e.g., Figure 8 of the Chiba patent.) Therefore, additional switching means and timing control circuitry would also be needed between the processing device 4 and the plurality of image projectors to multiplex the output signal to the inputs of the plurality of image projectors at the appropriate times.

Even, if all these elements were provided, it is still not logical to use a plurality of image projectors in the context of the Chiba patent. The Chiba patent design has already mixed and switched the processed signals onto a single output prior to providing that output to monitor 5. If one were so inclined to replace display 5 with image projector technology and a display screen, the logical choice would be to use **a single** image projector, rather than a plurality of image projectors as proposed.

By replacing a monitor with an image projector or plurality of image projectors, in the Chiba system, one introduces additional errors into the modified Chiba system which require calibration and adjustment due to beam parallax issues, beam orthogonality with respect to the display, distance changes, variation, and/or stability issues from image projector(s) to display. These errors sources being in addition to the errors sources for which the Chiba system was designed and intended to be calibrated. It should also be noted that using a plurality of projectors as opposed to using a single projector introduces more errors into the system.

For at least the reasons stated above, independent claim 1 of the present application is not rendered obvious by the Chiba and Johnson patents. Since claims 2, 3, 5, 6 and 8, depend, either directly or indirectly, from claim 1, these claims are similarly allowable.

Further, with regard to dependent claim 2, the Examiner the relies upon the Johnson patent for pick-up means for picking up an image projected on the image display means for correction. Specifically, the Examiner states:

It would have been obvious of one of ordinary skill in the art at the time of the invention, to replace the correction method of Chiba with the correction method of Johnson in order to provide a display that can be calibrated and re-calibrated with little or no manual invention.

The applicants respectfully disagree.

The Chiba patent is directed to correcting errors produced by an input stage of a stereoscopic vision endoscopic system receiving optical inputs of the same object over two paths. In such a system, the object, position, and/or orientation of the object with respect to the optical input stage can be expected to vary somewhat from one calibration to the next. Such a system is well suited to manual calibration techniques, as described in the Chiba patent, where human judgment and evaluation of the distortion, shape, etc. can be advantageously applied. In contrast, a system such as the Johnson patent system, which uses an image-pick up means such as a camera in conjunction with automated calibration processing to provide automated calibration

is better suited to applications where the controlled test input (see reference images and data in Figure 4 of the Johnson patent) can be a well controlled and a defined test signal and can be injected into the signal path, and is not well suited to applicants where calibrations are to be performed for an optical input stage viewing an object. The ability or inability to inject a well controlled test signal prior to the stage which needs correcting plays an important factor as to the selection of manual versus automated calibration.

In view of the above discussion, claim 2 of the current application is not obvious in view of the Chiba and Johnson patents for at least for this additional reason. In addition, since claims 3-6 depend, either directly or indirectly, from claim 2, these claims are also allowable for this additional reason.

With regard to independent claim 9, claim 9 is not rendered unpatentable over the Chabi and Johnson patents for the reasons previously stated above with respect to claim 1 and claim 2. Specifically, the Chabi patent does not disclose **both** image projecting means and image display means; one skilled in the art would not have been motivated to incorporate a **plurality** of image projectors from the Johnson patent into the Chabi patent system; and one skilled in the art would not have been motivated to incorporate the image pick up camera or cameras of the Johnson patent into the Chabi patent system and attempt to achieve automatic calibration.

For at least the reasons stated above, independent claim 9 is not rendered obvious by the Chabi and Johnson patents. Since claims 10-12 depend, either directly or

indirectly, from claim 9, these claims are similarly patentable.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chiba and Johnson patent as applied to claim 5 above, and further in view of U.S. Patent 5,879,065 to Shirochi et al. ("the Shirochi patent"). Even, *argumendo* if the Shirochi patent in combination with Chiba patent suggests shutters as an alternative technique to polarizers, this purported teaching does not compensate for the other deficiencies of the Chiba and Johnson patents with respect to independent claims 1 and 2 discussed above. Since claim 6 depends indirectly from claims 1 and 2, it is similarly allowable.

Claims 8 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chiba and Johnson patents as applied to claims 1 and 9, and further in view of patent document WO 94/22050 to Berglund.

Even, *arguendo*, that Berglund teaches using a six primary color projector and that it would have been obvious to combine this purported teaching with the Chiba and Johnson patents, this still does not compensate for the deficiencies of the Chiba and Johnson patents with respect to independent claims 1 and 9 discussed above. Since claims 8 and 12 depend from claims 1 and 9, respectively, these claims are similarly allowable.

New Claims

New claims 13-15 further distinguish the claimed invention over the Chiba and Johnson patents. These

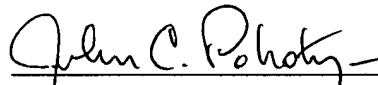
claims are supported, for example, by Figures 1 and 2 and their corresponding description in the present application.

Conclusion

In view of the foregoing amendments and remarks, the applicants respectfully submit that the pending claims are in condition for allowance. Accordingly, the applicants request that the Examiner pass this application to issue.

Respectfully submitted,

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CERTIFICATE OF MAILING under 37 C.F.R. 1.8(a)

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